FIG. 1

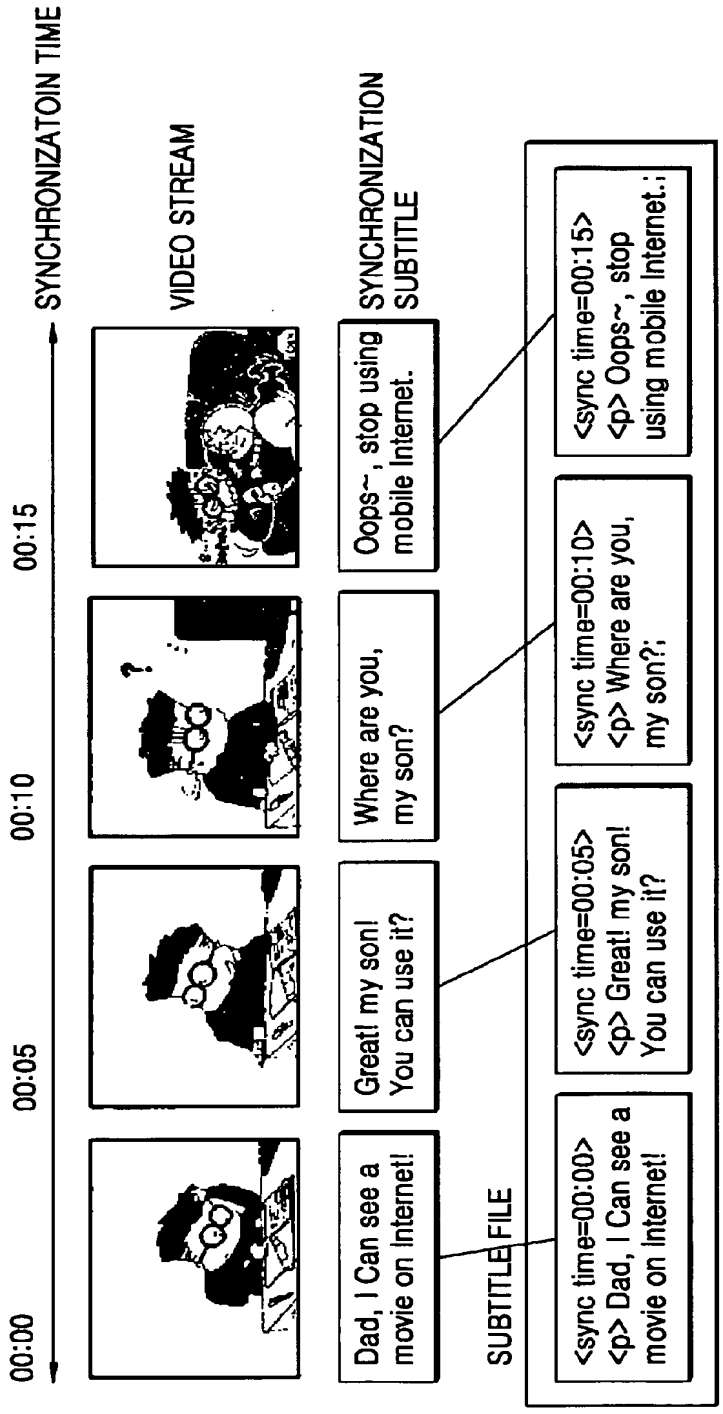

00:00
00:05
00:10
00:15
SYNCHRONIZATOIN TIME
VIDEO STREAM
SYNCHRONIZATION SUBTITLE
Dad, I Can see a movie on Internet!
Great! my son! You can use it?
Where are you, my son?
Oops~, stop using mobile Internet.
SUBTITLE FILE
<sync time=00:00> <p> Dad, I Can see a movie on Internet!
<sync time=00:05> <p> Great! my son! You can use it?
<sync time=00:10> <p> Where are you, my son?;
<sync time=00:15> <p> Oops~, stop using mobile Internet.;

FIG. 2

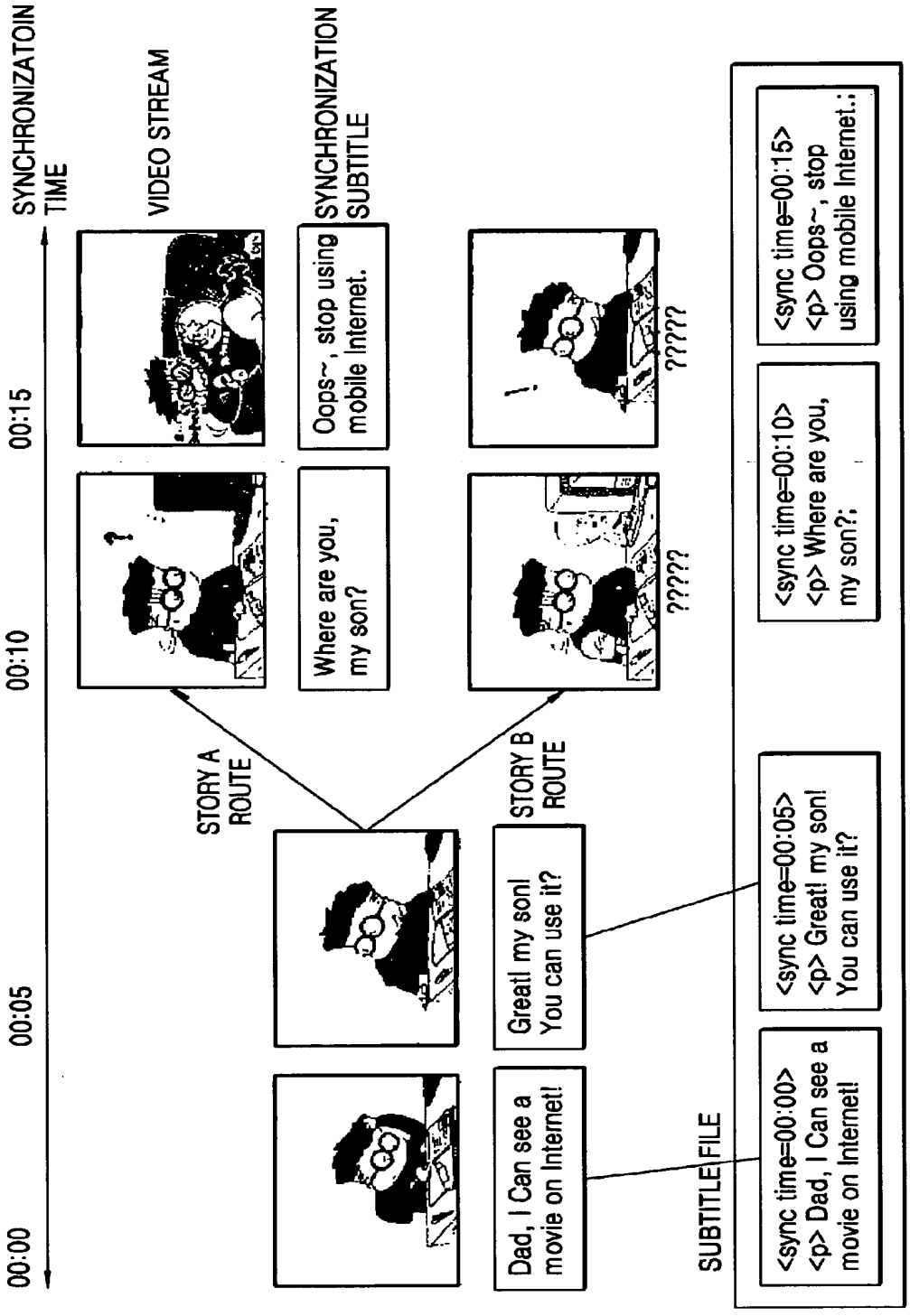

SYNCHRONIZATOIN TIME
00:00
00:05
00:10
00:15
VIDEO STREAM
SYNCHRONIZATION SUBTITLE
STORY A ROUTE
STORY B ROUTE
Dad, I Can see a movie on Internet!
Great! my son! You can use it?
Where are you, my son?
Oops~, stop using mobile Internet.
?????
?????
SUBTITLE FILE
<sync time=00:00>
<p> Dad, I Can see a movie on Internet!
<sync time=00:05>
<p> Great! my son! You can use it?
<sync time=00:10>
<p> Where are you, my son?;
<sync time=00:15>
<p> Oops~, stop using mobile Internet.;

FIG. 3

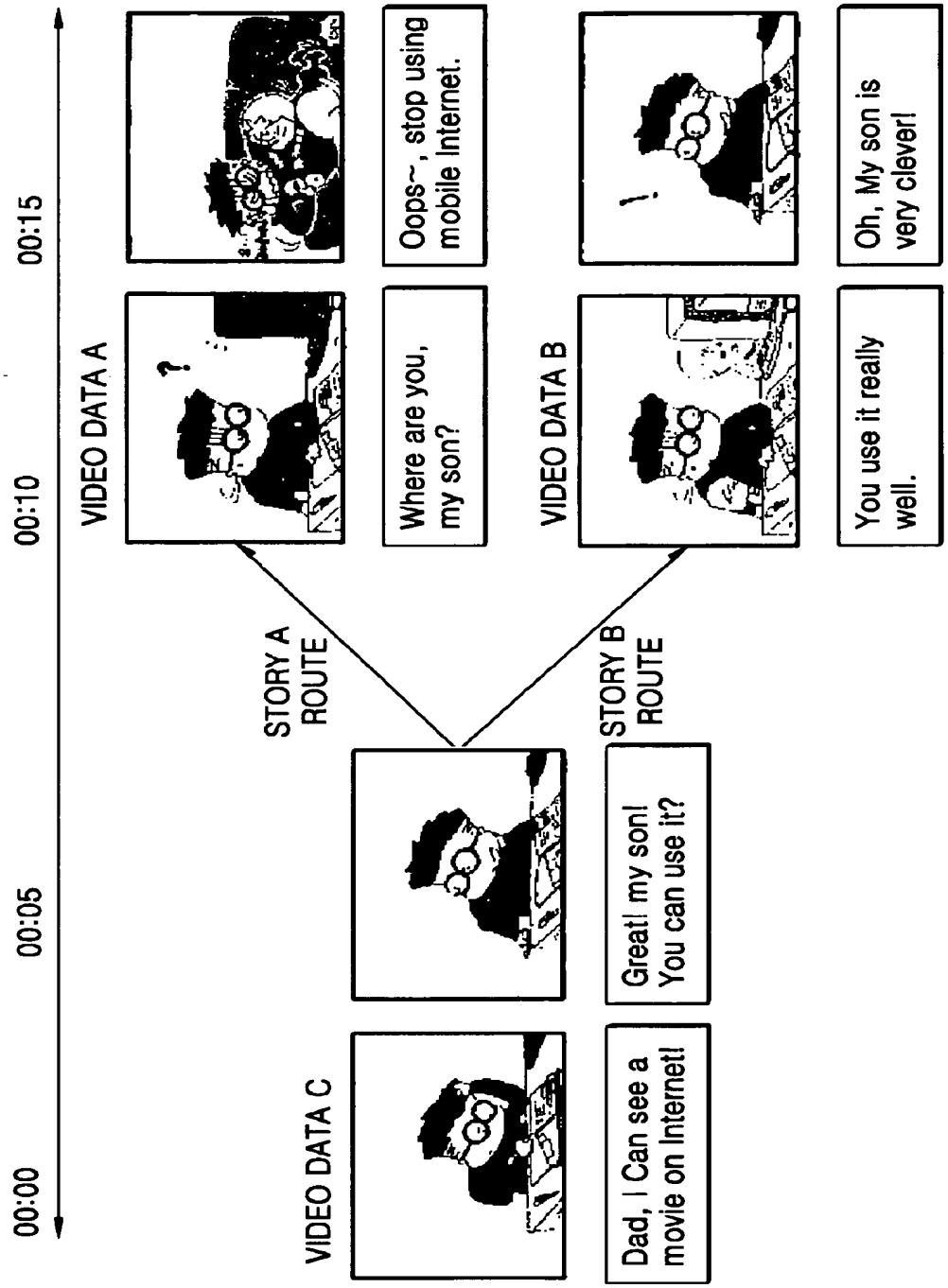

00:00
00:05
00:10
00:15
VIDEO DATA A
VIDEO DATA B
VIDEO DATA C
STORY A ROUTE
STORY B ROUTE
Dad, I Can see a movie on Internet!
Great! my son! You can use it?
Where are you, my son?
Oops~, stop using mobile Internet.
You use it really well.
Oh, My son is very clever!

FIG. 4

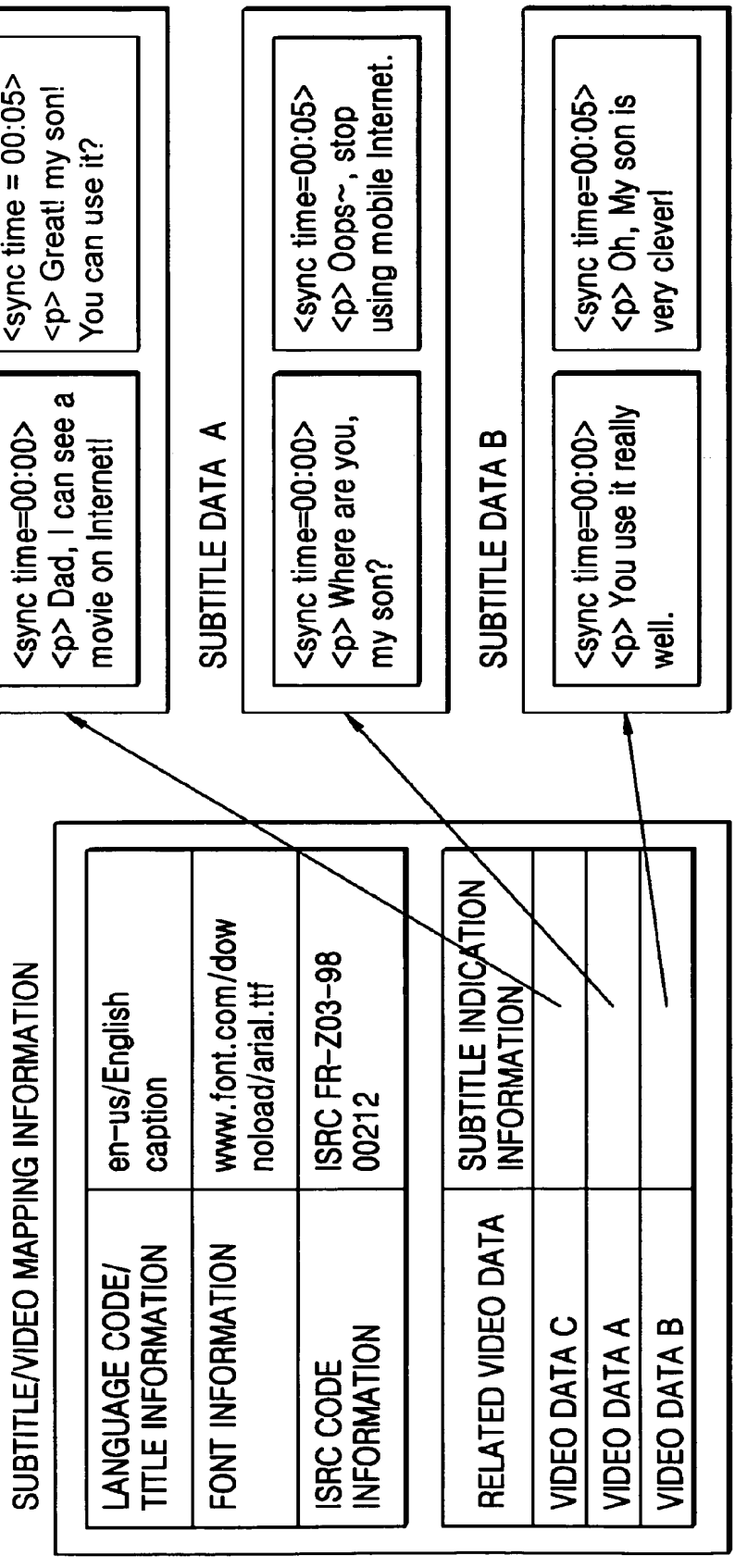

SUBTITLE DATA C
<sync time=00:00>
<p> Dad, I can see a movie on Internet!
<sync time = 00:05>
<p> Great! my son! You can use it?
SUBTITLE DATA A
<sync time=00:00>
<p> Where are you, my son?
<sync time=00:05>
<p> Oops~, stop using mobile Internet.
SUBTITLE DATA B
<sync time=00:00>
<p> You use it really well.
<sync time=00:05>
<p> Oh, My son is very clever!
SUBTITLE/VIDEO MAPPING INFORMATION
LANGUAGE CODE/ TITLE INFORMATION
en-us/English caption
FONT INFORMATION
www.font.com/download/arial.ttf
ISRC CODE INFORMATION
ISRC FR-Z03-98 00212
RELATED VIDEO DATA
SUBTITLE INDICATION INFORMATION
VIDEO DATA C
VIDEO DATA A
VIDEO DATA B

FIG. 5

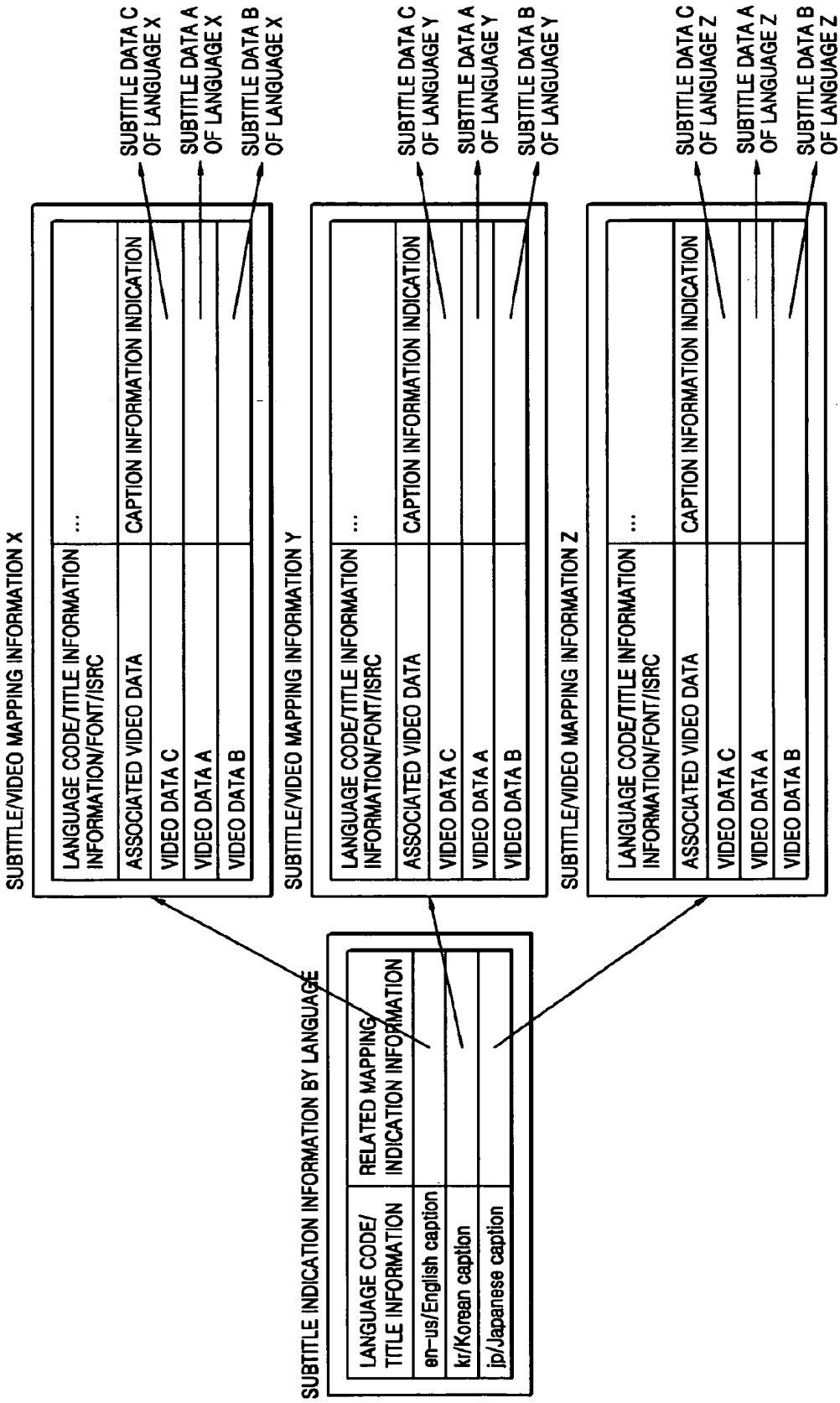

SUBTITLE INDICATION INFORMATION BY LANGUAGE
LANGUAGE CODE/ TITLE INFORMATION
RELATED MAPPING INDICATION INFORMATION
en-us/English caption
kr/Korean caption
jp/Japanese caption
SUBTITLE/VIDEO MAPPING INFORMATION X
LANGUAGE CODE/TITLE INFORMATION INFORMATION/FONT/ISRC
...
ASSOCIATED VIDEO DATA
CAPTION INFORMATION INDICATION
VIDEO DATA C
VIDEO DATA A
VIDEO DATA B
SUBTITLE DATA C OF LANGUAGE X
SUBTITLE DATA A OF LANGUAGE X
SUBTITLE DATA B OF LANGUAGE X
SUBTITLE/VIDEO MAPPING INFORMATION Y
LANGUAGE CODE/TITLE INFORMATION INFORMATION/FONT/ISRC
...
ASSOCIATED VIDEO DATA
CAPTION INFORMATION INDICATION
VIDEO DATA C
VIDEO DATA A
VIDEO DATA B
SUBTITLE DATA C OF LANGUAGE Y
SUBTITLE DATA A OF LANGUAGE Y
SUBTITLE DATA B OF LANGUAGE Y
SUBTITLE/VIDEO MAPPING INFORMATION Z
LANGUAGE CODE/TITLE INFORMATION INFORMATION/FONT/ISRC
...
ASSOCIATED VIDEO DATA
CAPTION INFORMATION INDICATION
VIDEO DATA C
VIDEO DATA A
VIDEO DATA B
SUBTITLE DATA C OF LANGUAGE Z
SUBTITLE DATA A OF LANGUAGE Z
SUBTITLE DATA B OF LANGUAGE Z

FIG. 6

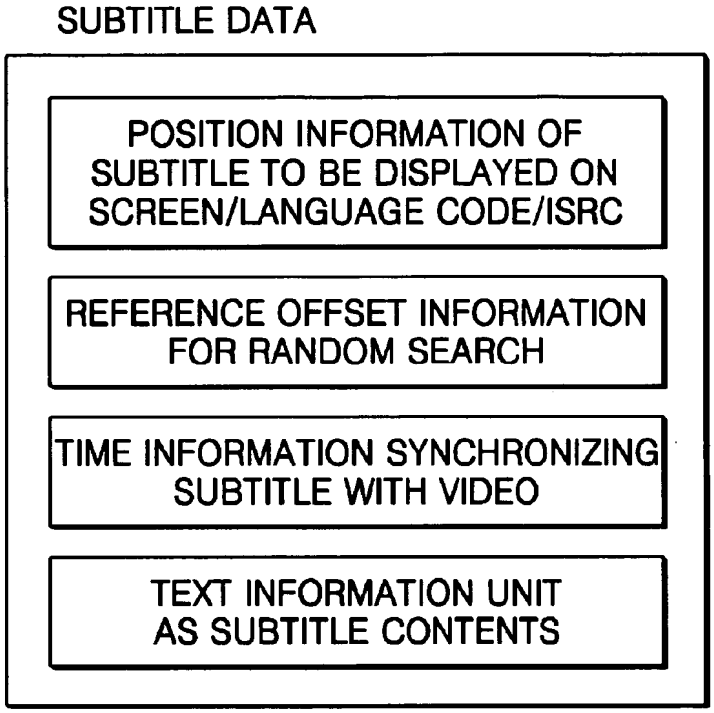
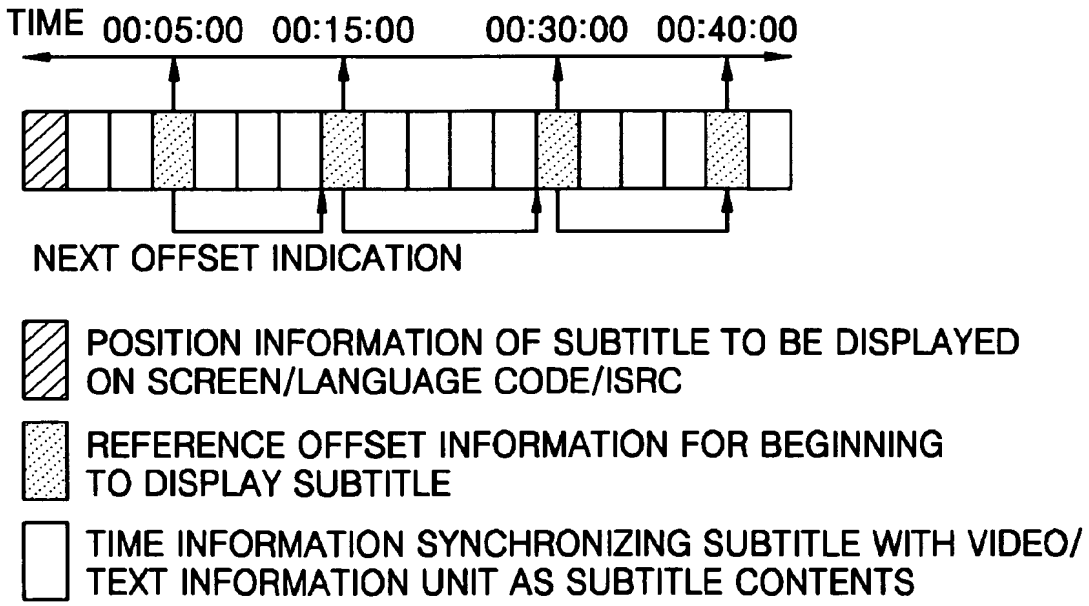

SUBTITLE DATA
POSITION INFORMATION OF SUBTITLE TO BE DISPLAYED ON SCREEN/LANGUAGE CODE/ISRC
REFERENCE OFFSET INFORMATION FOR RANDOM SEARCH
TIME INFORMATION SYNCHRONIZING SUBTITLE WITH VIDEO
TEXT INFORMATION UNIT AS SUBTITLE CONTENTS

FIG. 7


TIME
00:05:00
00:15:00
00:30:00
00:40:00
NEXT OFFSET INDICATION
POSITION INFORMATION OF SUBTITLE TO BE DISPLAYED ON SCREEN/LANGUAGE CODE/ISRC
REFERENCE OFFSET INFORMATION FOR BEGINNING TO DISPLAY SUBTITLE
TIME INFORMATION SYNCHRONIZING SUBTITLE WITH VIDEO/ TEXT INFORMATION UNIT AS SUBTITLE CONTENTS

# FIG. 8

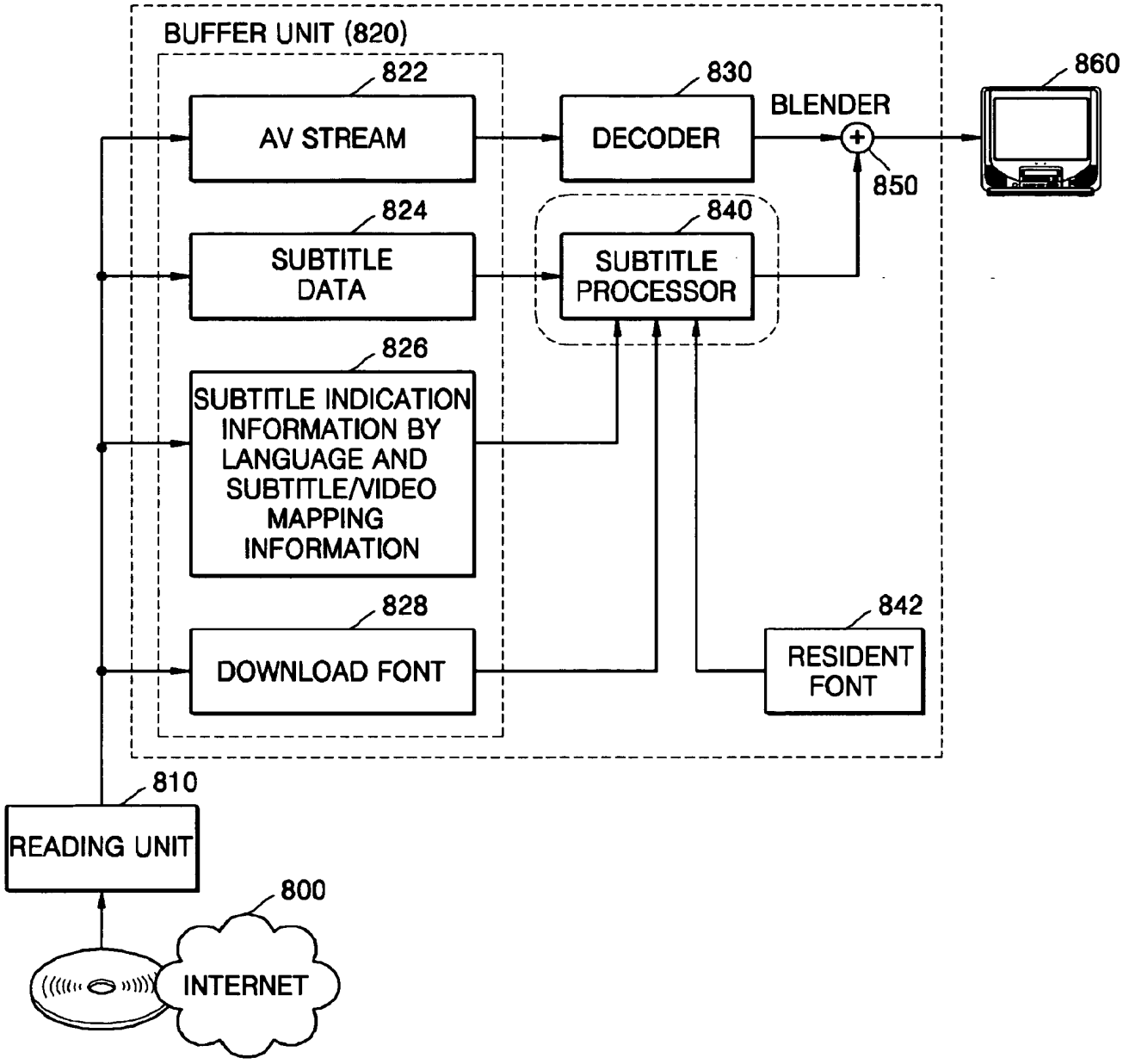

BUFFER UNIT (820)
822
AV STREAM
824
SUBTITLE DATA
826
SUBTITLE INDICATION INFORMATION BY LANGUAGE AND SUBTITLE/VIDEO MAPPING INFORMATION
828
DOWNLOAD FONT
830
DECODER
840
SUBTITLE PROCESSOR
BLENDER
850
860
842
RESIDENT FONT
810
READING UNIT
800
INTERNET

FIG. 9

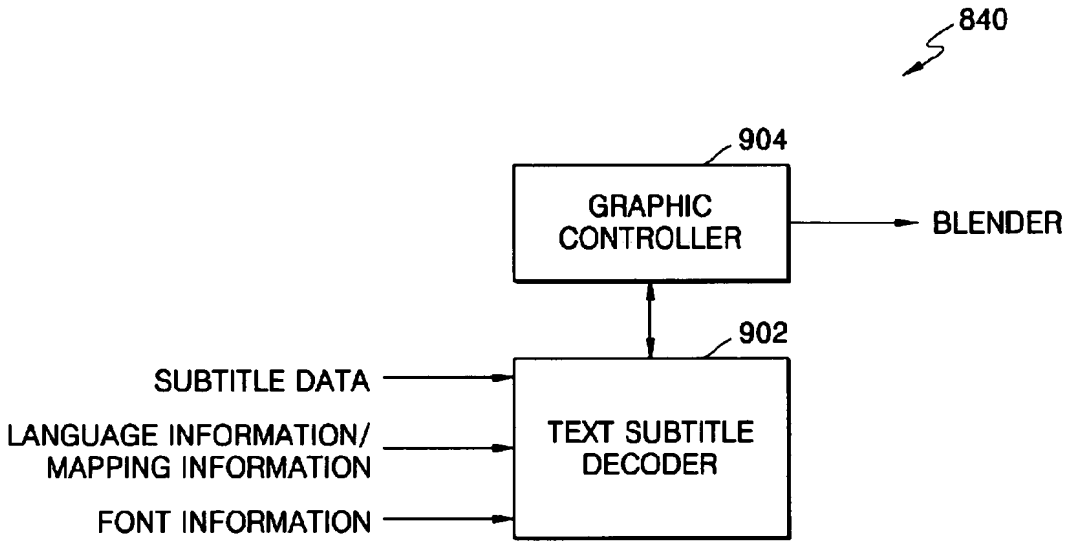

840
904
GRAPHIC CONTROLLER
BLENDER
902
SUBTITLE DATA
LANGUAGE INFORMATION/ MAPPING INFORMATION
FONT INFORMATION
TEXT SUBTITLE DECODER

FIG. 10

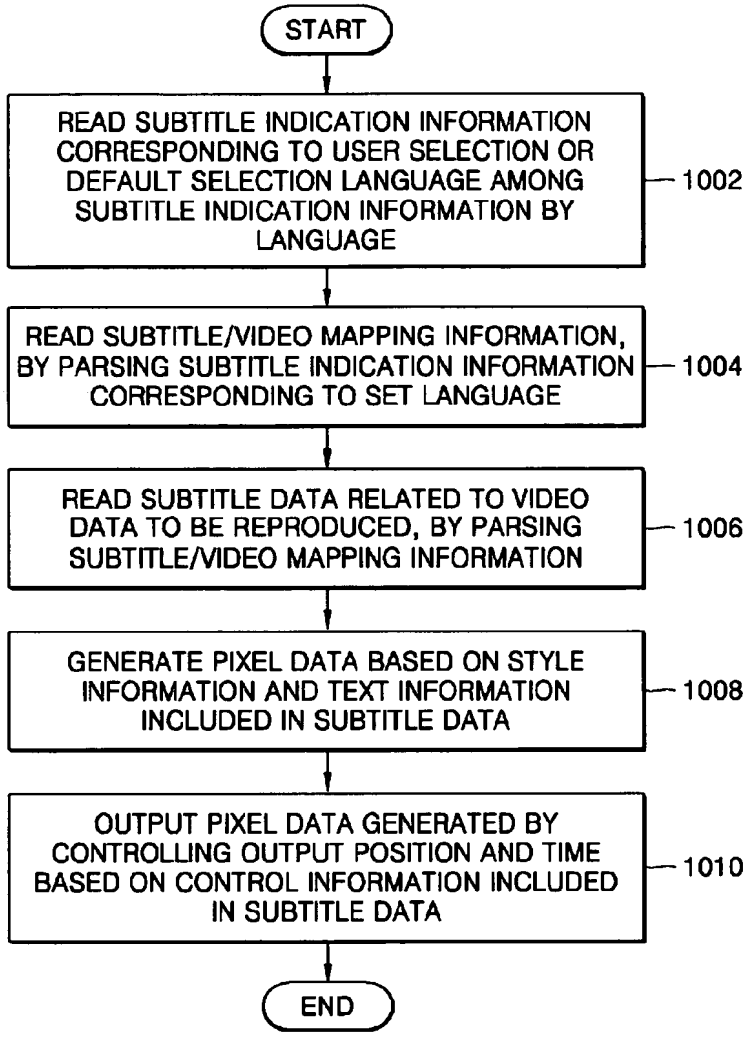
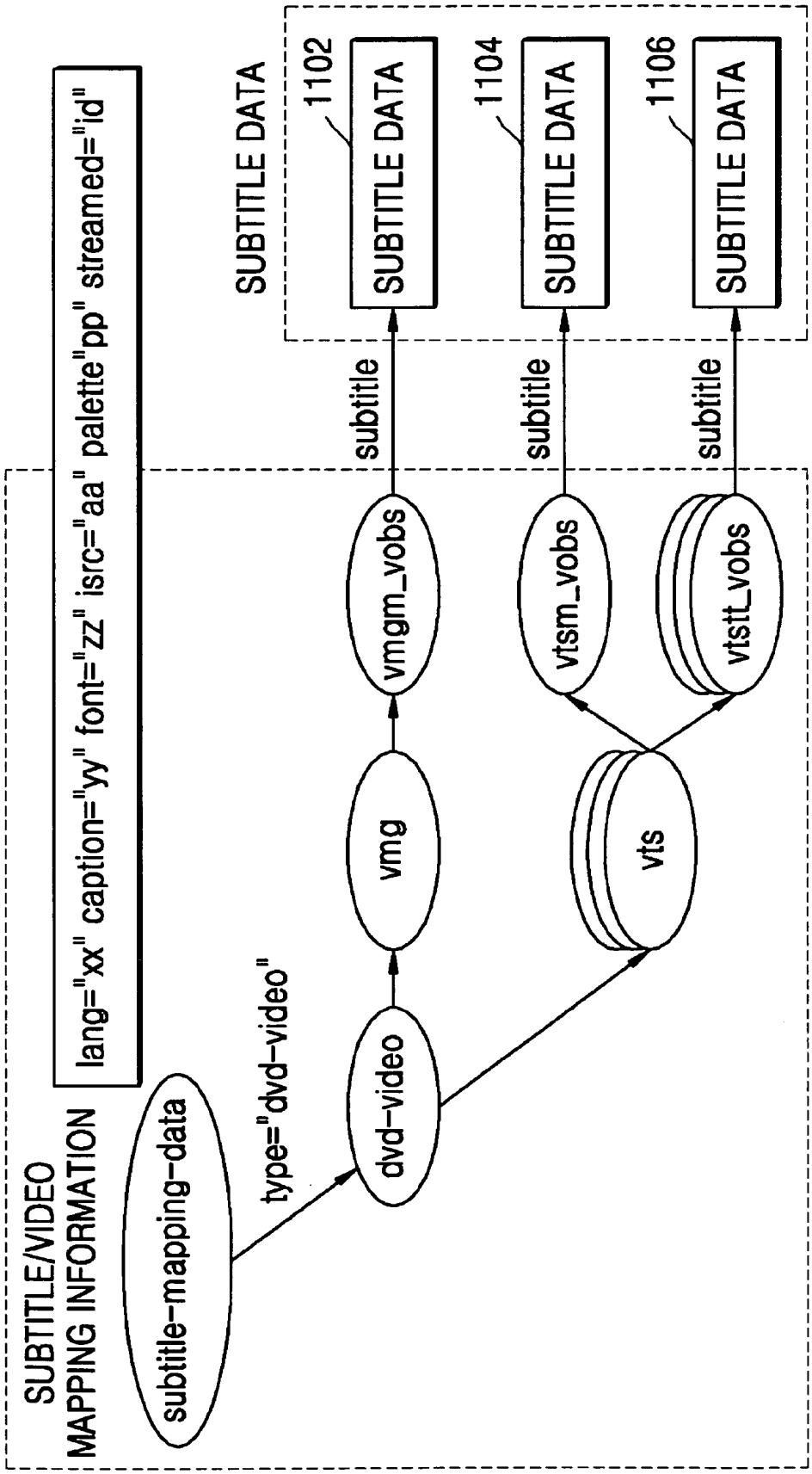

START
READ SUBTITLE INDICATION INFORMATION CORRESPONDING TO USER SELECTION OR DEFAULT SELECTION LANGUAGE AMONG SUBTITLE INDICATION INFORMATION BY LANGUAGE
1002
READ SUBTITLE/VIDEO MAPPING INFORMATION, BY PARSING SUBTITLE INDICATION INFORMATION CORRESPONDING TO SET LANGUAGE
1004
READ SUBTITLE DATA RELATED TO VIDEO DATA TO BE REPRODUCED, BY PARSING SUBTITLE/VIDEO MAPPING INFORMATION
1006
GENERATE PIXEL DATA BASED ON STYLE INFORMATION AND TEXT INFORMATION INCLUDED IN SUBTITLE DATA
1008
OUTPUT PIXEL DATA GENERATED BY CONTROLLING OUTPUT POSITION AND TIME BASED ON CONTROL INFORMATION INCLUDED IN SUBTITLE DATA
1010
END

FIG. 11


SUBTITLE/VIDEO MAPPING INFORMATION
subtitle-mapping-data
type="dvd-video"
lang="xx" caption="yy" font="zz" isrc="aa" palette"pp" streamed="id"
dvd-video
vmg
vmgm_vobs
vts
vtsm_vobs
vtstt_vobs
subtitle
subtitle
subtitle
SUBTITLE DATA
1102
SUBTITLE DATA
1104
SUBTITLE DATA
1106
SUBTITLE DATA

# FIG. 12

```
<subtitle-mapping-data type="dvd-video" lang="en-us" caption="English caption"
font="http://www.font.com/download/arial.ttf" isrc=" ISRC FR-Z03-98-00212"
streamId="32">
<dvd-video>
<palette>
        <color index="0" yuv="296ef0" />
        <color index="1 yuv="108080" />
        <color index="2 yuv="3b8080" />
        <color index="3 yuv="668080" />
        <color index="4 yuv="918080" />
        <color index="5 yuv="bc8080" />
        <color index="6 yuv="eb8080" />
        <color index="7 yuv="108080" />
        <color index="8 yuv="108080" />
        <color index="9 yuv="108080" />
        <color index="10" yuv="108080" />
        <color index="11" yuv="108080" />
        <color index="12" yuv="108080" />
        <color index="13" yuv="108080" />
        <color index="14" yuv="108080" />
        <color index="15" yuv="108080" />
</palette>
<vmg>
        <vmgm_vobs>
                <subtitle vob_idn="1" href="file://english_vmgm.text" /> —— 1202
        </vmgm_vobs>
</vmg>
<vts idn="1">
        <vtsm_vobs>
                <subtitle vob_idn="1" href=" file://english_vtsm.text" /> —— 1204
        </vtsm_vobs>
        <vtstt_vobs>
                <subtitle vob_idn="1-9" href=" file://english_tt1vob1.text" />
                <subtitle vob_idn="10-49" href=" file://english_tt1vob10.text" />   } 1206
                <subtitle vob_idn="50-100" href=" file://english_tt1vob50.text" />
        </vtstt_vobs>
</vts>
</dvd-video>
</subtitle-mapping-data>
```

FIG. 13

| | | | |
|---|---|---|---|
| LANGUAGE (EXAMPLE. en-us) | | | |
| SUBTITLE TITLE (EXAMPLE. English caption) | | | |
| FONT INFORMATION (EXAMPLE, http://www.font.com/downlocd/arial.tff) | | | |
| ISRC (EXAMPLE, ISRC FR-Z03-98-00212) | | | |
| PALETTE INFORMATION | | | |
| STREAM ID INFORMATION | | | |
| VOBS INDICATION INFORMATION (EXAMPLE, VMGM_VOBS) | VOB INDICATION INFORMATION(1) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_vmgm.txt) | 1302 |
| VOBS INDICATION INFORMATION (EXAMPLE, VTSM_VOBS) | VOB INDICATION INFORMATION(1) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_vtsm.text) | 1304 |
| VOBS INDICATION INFORMATION (EXAMPLE, VTSTT_VOBS) | VOB INDICATION INFORMATION(1-9) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_tt1vob1.text) | 1306 |
| VOBS INDICATION INFORMATION (EXAMPLE, VTSTT_VOBS) | VOB INDICATION INFORMATION(10-49) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_tt1vob10.text) | |
| VOBS INDICATION INFORMATION (EXAMPLE, VTSTT_VOBS) | VOB INDICATION INFORMATION(50-100) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_tt1vob50.text) | |

FIG. 14

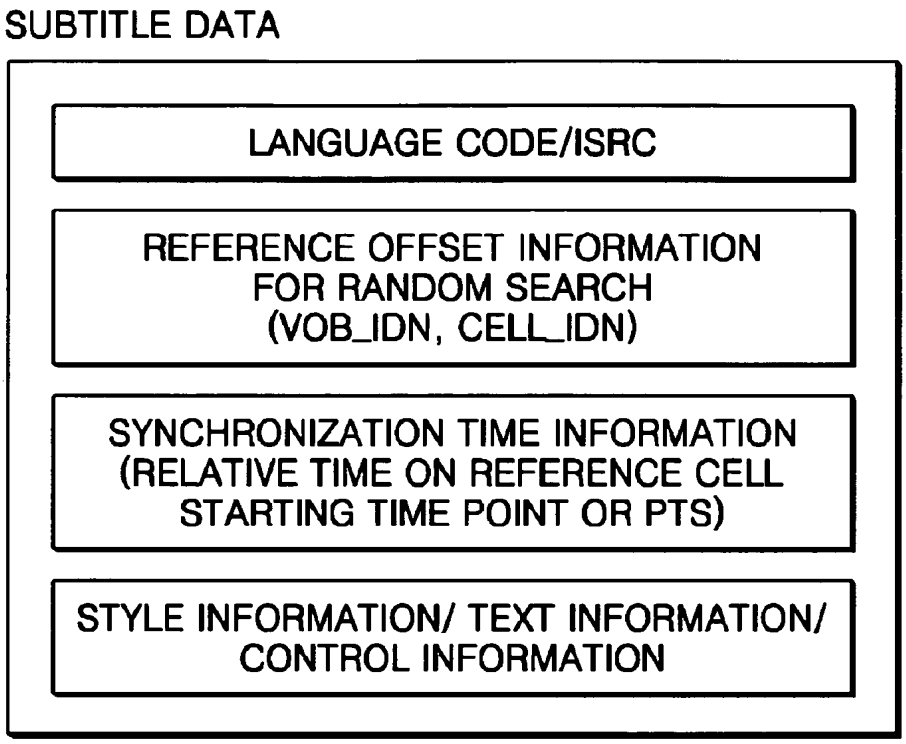
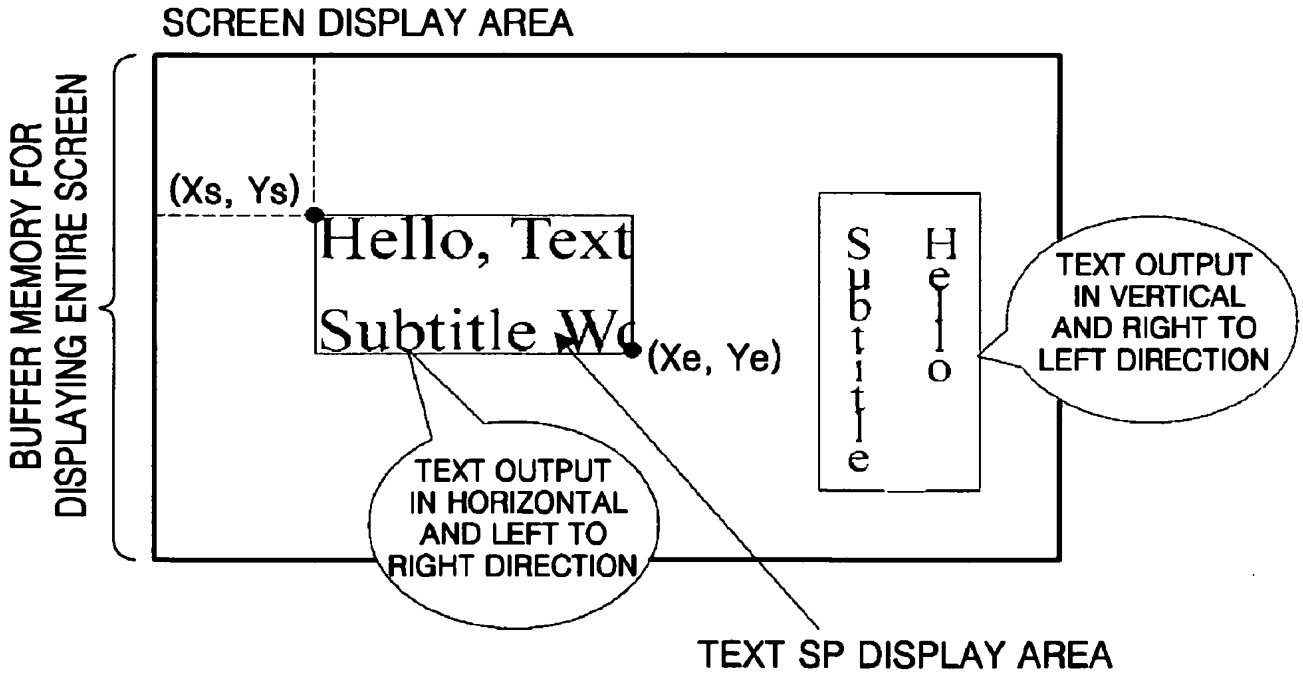



FIG. 15A



# FIG. 15B

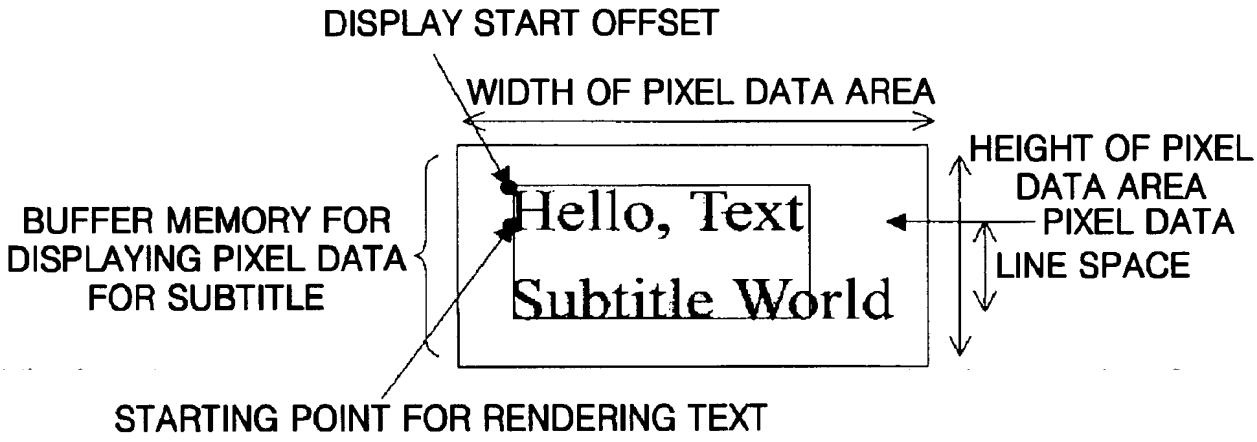
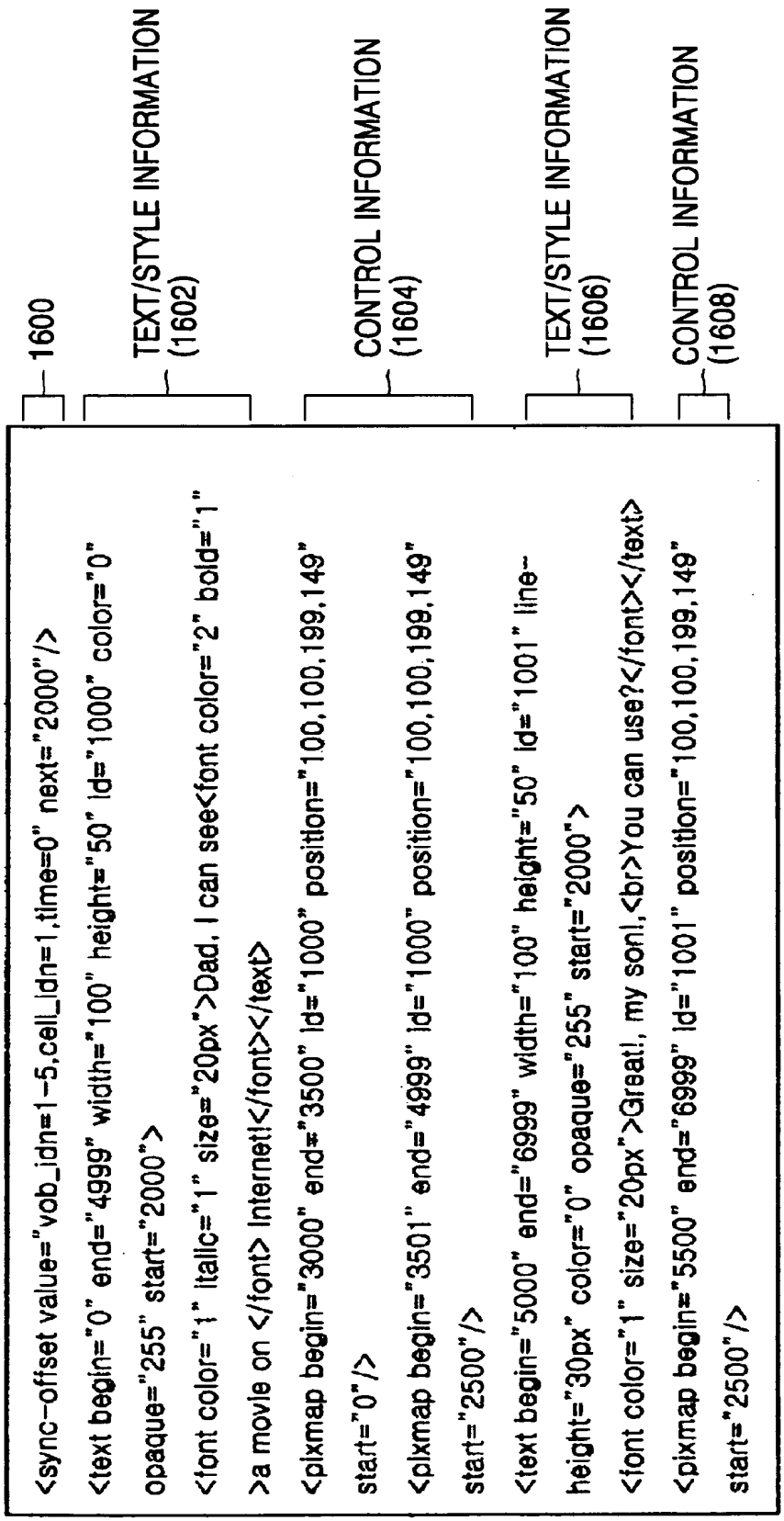

DISPLAY START OFFSET
WIDTH OF PIXEL DATA AREA
HEIGHT OF PIXEL DATA AREA
PIXEL DATA
LINE SPACE
BUFFER MEMORY FOR DISPLAYING PIXEL DATA FOR SUBTITLE
Hello, Text
Subtitle World
STARTING POINT FOR RENDERING TEXT

FIG. 16


1600
TEXT/STYLE INFORMATION (1602)
CONTROL INFORMATION (1604)
TEXT/STYLE INFORMATION (1606)
CONTROL INFORMATION (1608)
<sync-offset value="vob_idn=1-5,cell_idn=1,time=0" next="2000"/>
<text begin="0" end="4999" width="100" height="50" id="1000" color="0" opaque="255" start="2000">
<font color="1" italic="1" size="20px">Dad, I can see<font color="2" bold="1">a movie on </font> Internet!</font></text>
<pixmap begin="3000" end="3500" id="1000" position="100,100,199,149" start="0"/>
<pixmap begin="3501" end="4999" id="1000" position="100,100,199,149" start="2500"/>
<text begin="5000" end="6999" width="100" height="50" id="1001" line-height="30px" color="0" opaque="255" start="2000">
<font color="1" size="20px">Great!, my son!,<br>You can use?</font></text>
<pixmap begin="5500" end="6999" id="1001" position="100,100,199,149" start="2500"/>

# FIG. 17

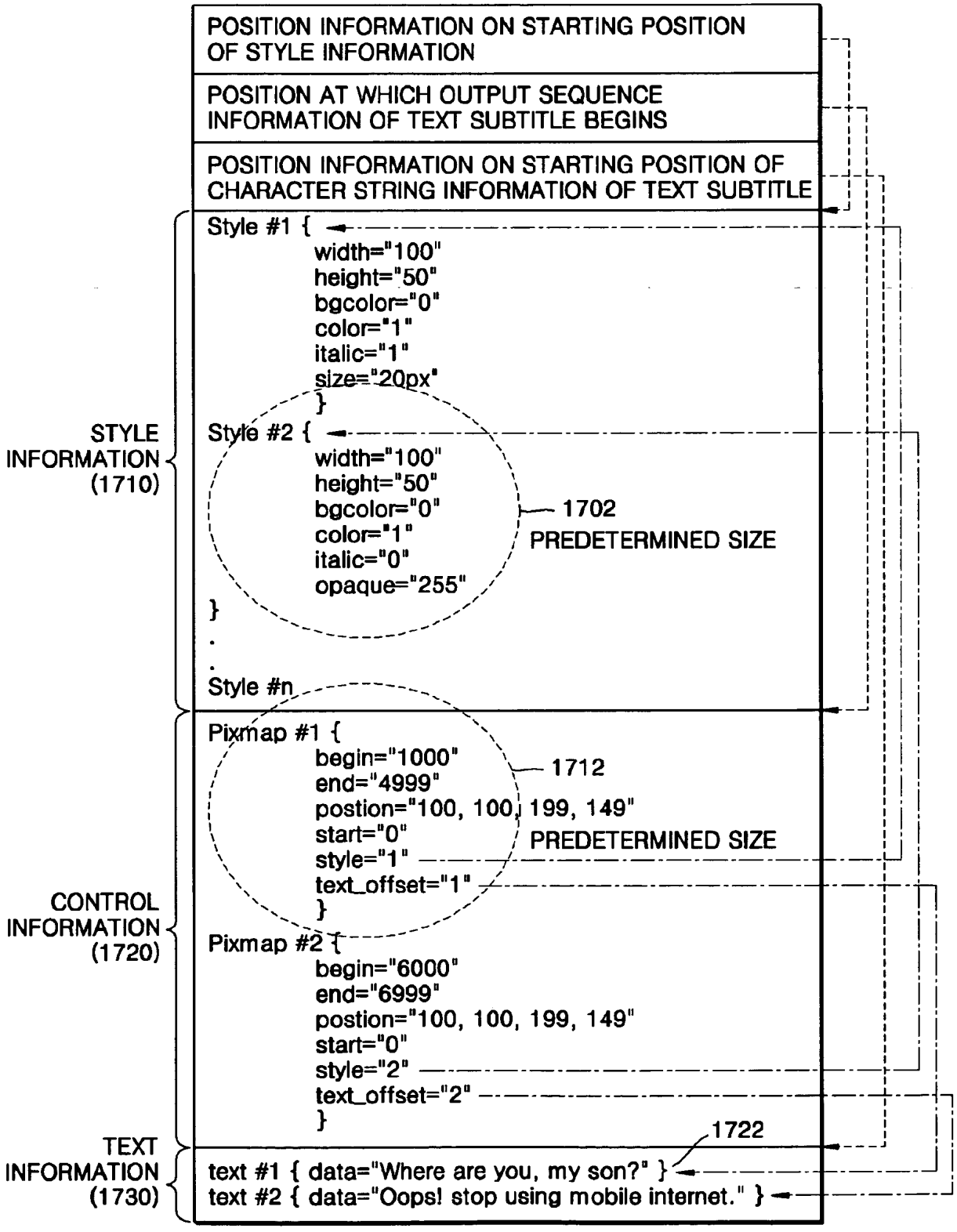
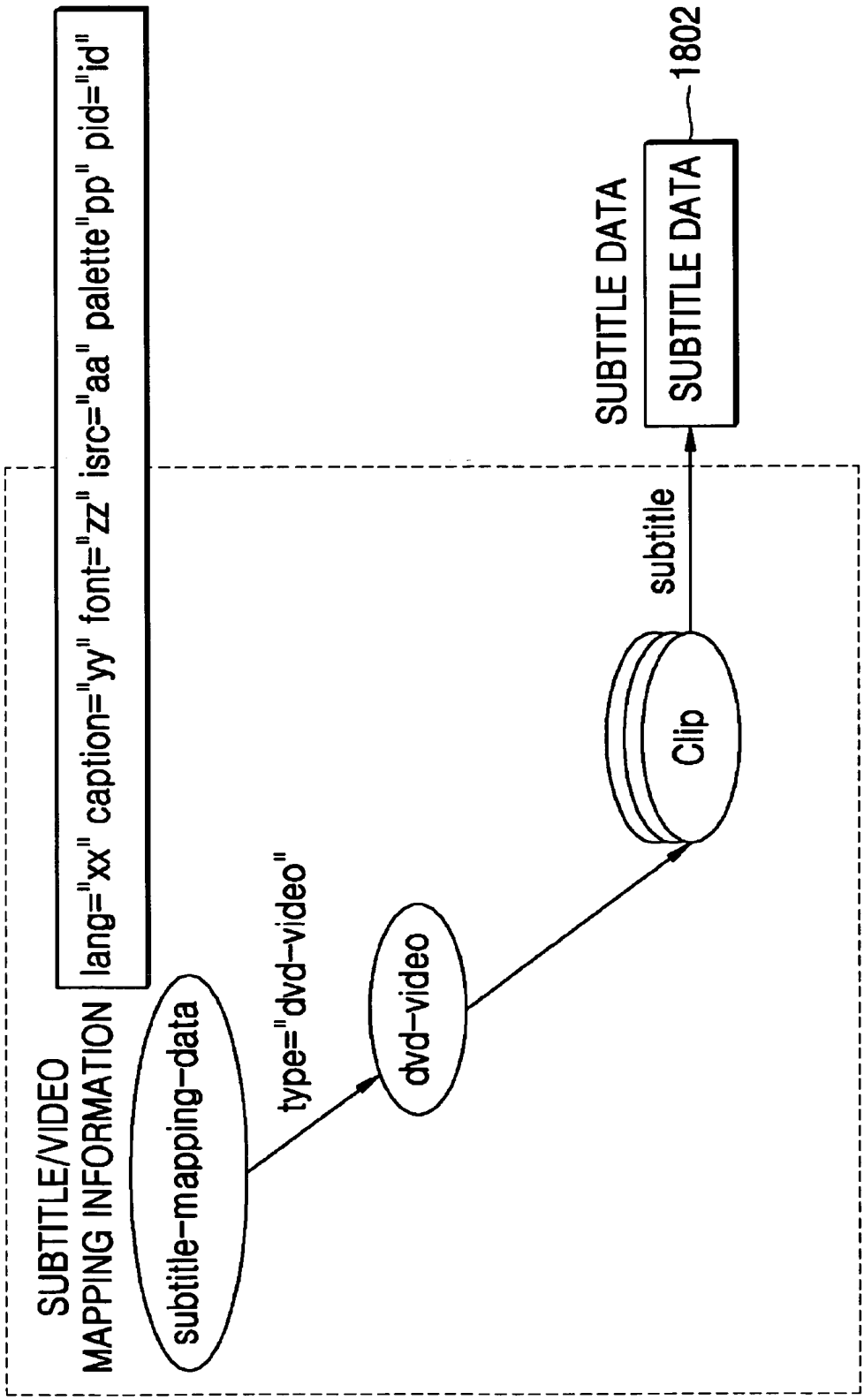

POSITION INFORMATION ON STARTING POSITION OF STYLE INFORMATION
POSITION AT WHICH OUTPUT SEQUENCE INFORMATION OF TEXT SUBTITLE BEGINS
POSITION INFORMATION ON STARTING POSITION OF CHARACTER STRING INFORMATION OF TEXT SUBTITLE
Style #1 {
width="100"
height="50"
bgcolor="0"
color="1"
italic="1"
size="20px"
}
Style #2 {
width="100"
height="50"
bgcolor="0"
color="1"
italic="0"
opaque="255"
}
.
.
Style #n
1702
PREDETERMINED SIZE
STYLE INFORMATION (1710)
Pixmap #1 {
begin="1000"
end="4999"
postion="100, 100, 199, 149"
start="0"
style="1"
text_offset="1"
}
Pixmap #2 {
begin="6000"
end="6999"
postion="100, 100, 199, 149"
start="0"
style="2"
text_offset="2"
}
1712
PREDETERMINED SIZE
CONTROL INFORMATION (1720)
1722
text #1 { data="Where are you, my son?" }
text #2 { data="Oops! stop using mobile internet." }
TEXT INFORMATION (1730)

FIG. 18


SUBTITLE/VIDEO MAPPING INFORMATION
lang="xx" caption="yy" font="zz" isrc="aa" palette"pp" pid="id"
subtitle-mapping-data
type="dvd-video"
dvd-video
Clip
subtitle
SUBTITLE DATA
SUBTITLE DATA
1802

# FIG. 19

```
<subtitle-mapping-data type="blu-ray-video" lang="en-us" caption="English caption">
<blu-ray-video>
font="http://www.font.com/download/arial.ttf" isrc=" ISRC FR-Z03-98-00212" pid="32">
<dvd-video>
<subtitle clip_idn="0001.clpi" href="english_0001.text" />
<subtitle clip_idn="0002.clpi" href="english_0002.text" />
<subtitle clip_idn="0003.clpi" href="english_0003.text" />
</blu-ray-video>
</subtitle-mapping-data>
```

1902

# FIG. 20

| | |
|---|---|
| LANGUAGE (EXAMPLE, en-us) | |
| SUBTITLE TITLE (EXAMPLE, English caption) | |
| FONT INFORMATION (EXAMPLE, http://www.font.com/downlocd/arial.tff) | |
| ISRC (EXAMPLE에, ISRC FR-Z03-98-00212) | |
| PID INFORMATION | |
| CLIP INDICATION INFORMATION (0001.clipi) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE, file://english_001.text) |
| CLIP INDICATION INFORMATION (0001.clipi) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE,file://english_002.text) |
| CLIP INDICATION INFORMATION (0001.clipi) | SUBTITLE DATA POSITION INFORMATION (EXAMPLE,file://english_003.text) |

2002

FIG. 21

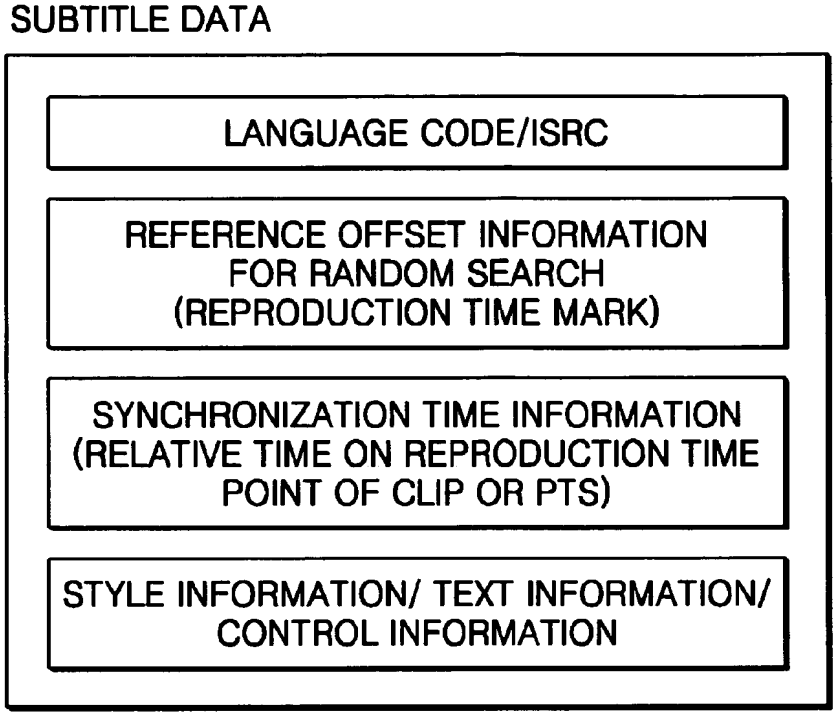
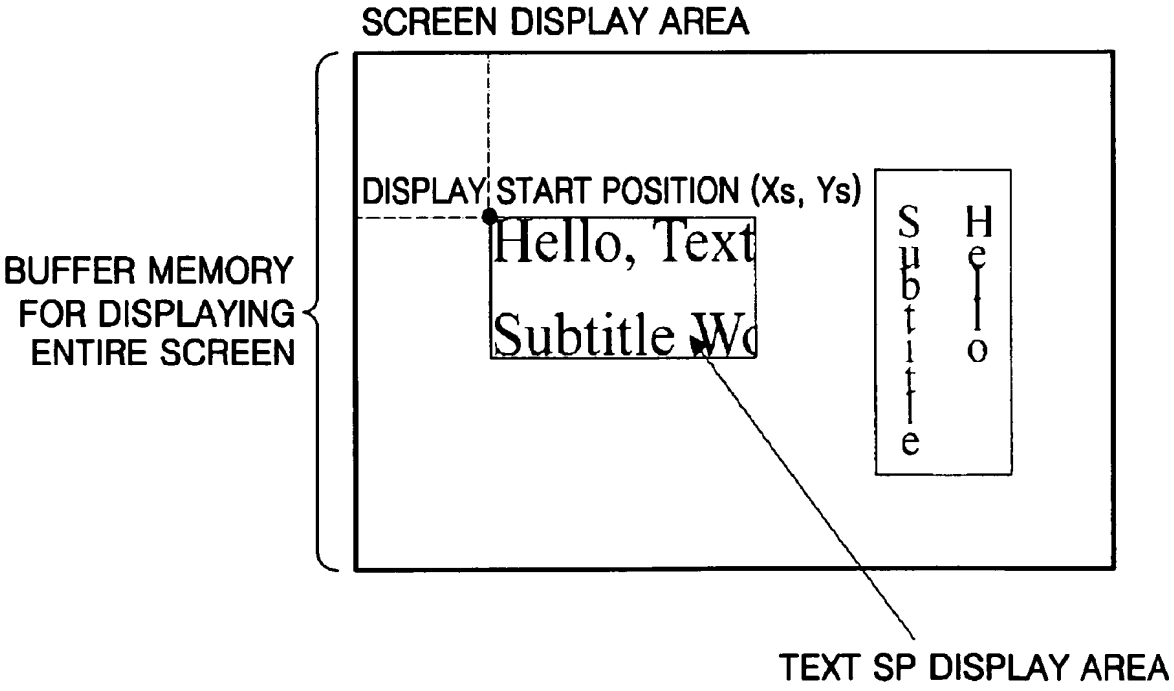



FIG. 22A



# FIG. 22B

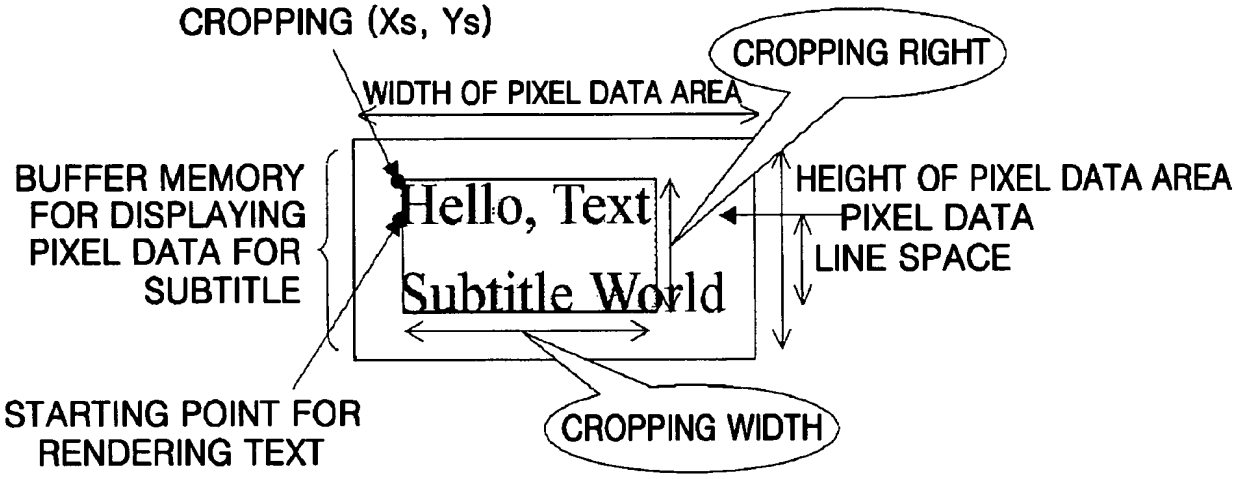

CROPPING (Xs, Ys)
CROPPING RIGHT
WIDTH OF PIXEL DATA AREA
BUFFER MEMORY FOR DISPLAYING PIXEL DATA FOR SUBTITLE
Hello, Text
Subtitle World
HEIGHT OF PIXEL DATA AREA
PIXEL DATA
LINE SPACE
STARTING POINT FOR RENDERING TEXT
CROPPING WIDTH

FIG. 23

```
<subtitle-data isrc FR-Z03-98-00212" lang="eb-us">
<sync-offset value="0" next="20000"/>
<palette id="1">
    <color index="0" yuv="296efoff"/>
    <color index="1" yuv="10808off"/>
    <color index="2" yuv="3b808off"/>
    <color index="3" yuv="66808off"/>
    <color index="4" yuv="91808off"/>
    <color index="5" yuv="bc808off"/>
</palette>
<text begin="0" end="4999" width="100" height="5-" id="1000" color="0"
start="2000">
<font color="1" italic="1" size="20px">Dad, I can see<font color="2" bold="1"
>a movie on </font> Internet </font></text>
<composition begin="3000" end="4999" palette="1">
<pixmap id="1000" position="100.100" cropping="0.0.100.50"/>
<pixmap id="1000" position="300.300" cropping="0.25.100.25"/>
</composition>
<text begin="5000" end="6999" width="100" height="50" id="1001" line-
height="30px" color="0" start="2000">
<font color="1" size="20px">Great! my son!<br>You can use?</font></text>
<pixmap position="100.100" cropping="0.0.100.50"/>
</composition>
</sublitle-data>
```

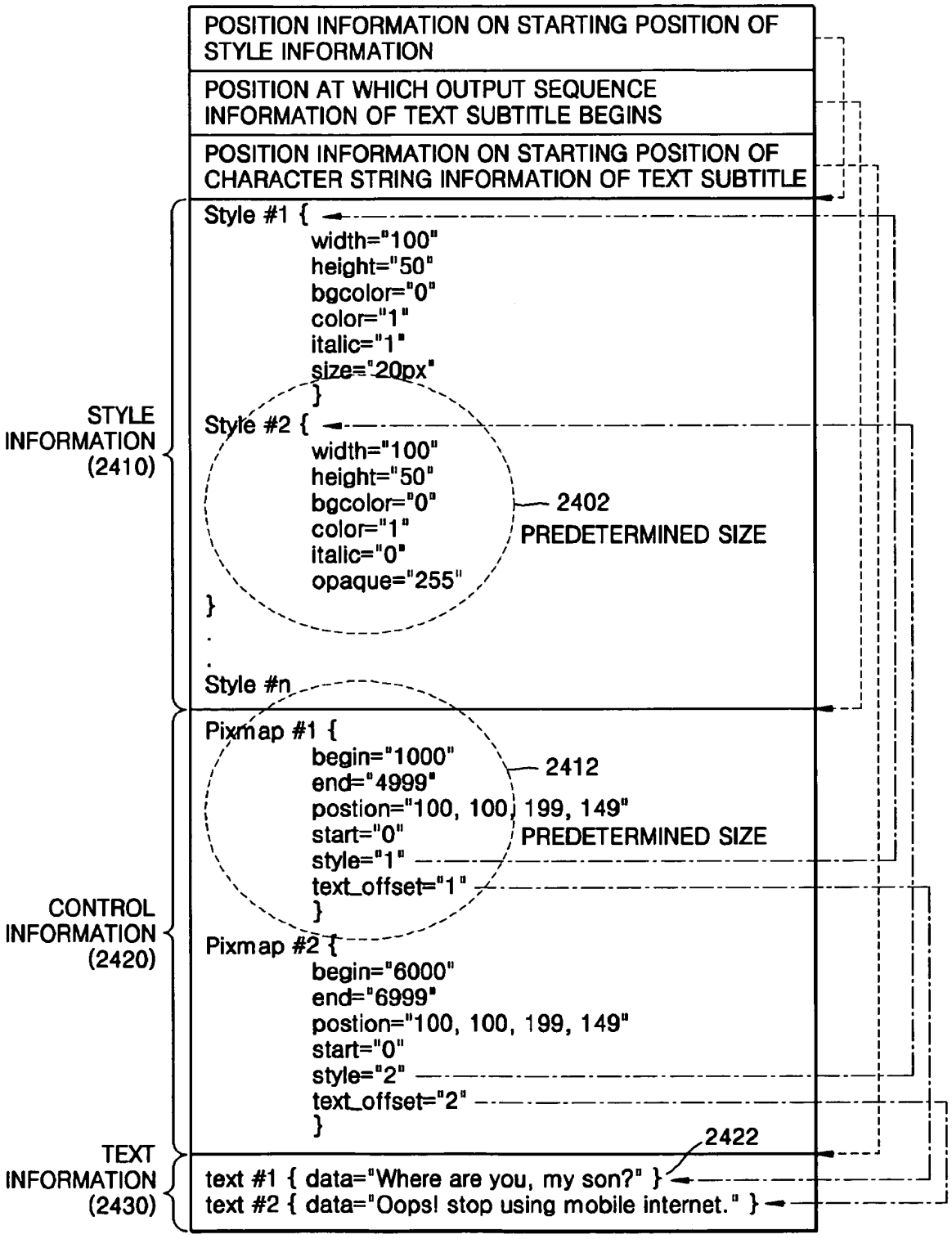
TEXT/STYLE INFORMATION (2302)

CONTROL INFORMATION (2304)

TEXT/STYLE INFORMATION (2306)

CONTROL INFORMATION (2308)

# FIG. 24


POSITION INFORMATION ON STARTING POSITION OF STYLE INFORMATION
POSITION AT WHICH OUTPUT SEQUENCE INFORMATION OF TEXT SUBTITLE BEGINS
POSITION INFORMATION ON STARTING POSITION OF CHARACTER STRING INFORMATION OF TEXT SUBTITLE
STYLE INFORMATION (2410)
Style #1 {
width="100"
height="50"
bgcolor="0"
color="1"
italic="1"
size="20px"
}
Style #2 {
width="100"
height="50"
bgcolor="0"
color="1"
italic="0"
opaque="255"
}
2402
PREDETERMINED SIZE
Style #n
CONTROL INFORMATION (2420)
Pixmap #1 {
begin="1000"
end="4999"
postion="100, 100, 199, 149"
start="0"
style="1"
text_offset="1"
}
2412
PREDETERMINED SIZE
Pixmap #2 {
begin="6000"
end="6999"
postion="100, 100, 199, 149"
start="0"
style="2"
text_offset="2"
}
TEXT INFORMATION (2430)
2422
text #1 { data="Where are you, my son?" }
text #2 { data="Oops! stop using mobile internet." }